BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

As rescanning documents *will not* correct images, please do not report the images to the Image Problem Mailbox.

The applicant respectfully suggests that this conclusion was erroneous because neither Murthy nor Mantell, alone or in combination, disclose, teach or suggest all of the limitations of any of Claims 15-27. Nor has the examiner shown a motivation to combine combine either the etching process of Mantell with the ink slots of Murthy or the pentagonal-shaped ejector channels of Mantell with the ink feed slots of Murthy.

The applicant hereby requests that the examiner reconsider the application and allow the claims. The applicant respectfully suggests that the examiner failed to establish a prima facie case of obviousness, at least because the examiner failed to show a motive to combine the two cited references and because the references do not disclose, alone or in combination, every limitation of the claims.

I. OBVIOUSNESS:

In order to establish a prima facie case of obviousness, an examiner must show at least: (1) a suggestion or motivation to combine reference teachings; (2) a reasonable expectation of success; and (3) that the prior art references when combined must teach or suggest all the limitations. See MPEP § 2142-2143.3; In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). In this case, the applicant respectfully suggests that the examiner failed to show any one of these elements.

A. Motivation to Combine:

It has been said that, "[t]here are three possible sources for a motivation to combine references: the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art." MPEP § 2143.01; In re Rouffet, 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1457-58 (Fed. Cir. 1998).

The References:

1. Mantell:

Mantell discloses thermal ink jet printhead with pentagonal ejector channels. The disclosed channel is for use in a so-called "sideshooter" ink jet printhead. Col. 1, lines 43 to 62. The channels are "connected to an ink supply manifold . . . at one end [of the channel], with the opposite end being effectively open for passage of liquid ink therethrough to the print sheet." Col. 2, lines 63-67.

A heating element within the channel creates heat which nucleates liquid ink in the channel, causing a quantity of liquid ink to be pushed out one end of the channel 16 and onto a print sheet. Col. 2, lines 60-63. The ink flows longitudinally through the channel along the plane of the second surface. The shape of the channels purportedly provides an improvement over the unpredictable directionality of ejected droplets from triangular cross-sectional ejectors.

Mantell discloses an anisotropic reactive ion etch process followed by a wet etch process to create the pentagonal channels. Mantell does not disclose, teach or suggest that such a process could be used to create ink slots as disclosed in Murthy.

2. Murthy:

Murthy discloses methods for fabricating ink feed slots in silicon substrate for use in thermal ink-jet print heads. Col. 2, lines 49-51. The disclosed feed slots extend from a first surface 4 of a substrate 2 to a second surface 6 of the substrate 2. Fig. 1. The ink flows through the feed slots in a direction from the first surface to the second surface. Heater elements located on the second surface cause ink to be ejected through ejectors located above the second surface.

B. No Motivation to Combine Murthy and Mantell:

There is no motivation to combine Mantell with Murthy at least because the problem to be solved in Mantell is different from the problem to be solved in Murthy.

Mantell discloses pentagonal-shaped ejector channels which use heater resistors to move ink longitudinally through the length of the channel, the shape improving the directionality of ejected droplets. Murthy discloses ink feed channels which feed ink transversly across an ink feed slot to heater resistors and ejectors located above a second surface. Neither Mantell nor Murthy, alone or in combination, disclose, teach or suggest combining the shape of Mantell's ejector channels with the ink feed slots of Murthy.

Mantell discloses an etching method to create pentagonal-shaped ejector channels. Neither Mantell nor Murthy, alone or in combination, disclose, teach or suggest combining the etching technique of Mantell to create the ink feed slots of Murthy.

C. References Do Not Disclose Every Limitation of Claims

1. Claims 15 - 27:

Neither Murthy nor Mantell disclose, teach or suggest at least the following limitations of Claims 15-27:

> "said fluid slot formed by deep reactive ion etching followed by anisotropic wet etching,"

Mantell discloses an etching method which creates pentagonal-shaped ejector channels. However, since, as discussed above, there is no disclosure, teaching or suggestion to create ink slots of Murthy with the shape of the ejector channels of Mantell, there is motivation to use the ejector channel etching method of Mantell to manufacture the ink feed slots of Murthy.

2. Claims 16, 18 and 19-20:

The Examiner further asserts that Murthy at column 8, lines 45-50 describes the limitations added by Claims 16, 18, 19 and 20. Applicants respectfully disagree. Murthy at column 8, lines 45-50 refers to drilled alignment holes - not feed slots. Murthy recites:

> "Next, a plurality of alignment holes 38, preferably at least about three or more, are drilled at spatially separate locations in the silicon wafer substrate 34 (FIG. 3A) using a laser beam."

Murthy, column 8, lines 29-33.

> "The laser drilled holes 38 preferably have an entry 46 on the first surface 4 of the silicon substrate of from about 5 to about 100 microns, preferably about 50 microns and an exit 48 on the second surface 6 of the silicon substrate 2 having a diameter of from about 5 to about 50 microns, preferably about 25 microns."

Murthy, column 8, 45-50. The Murthy disclosures relating to the size of laser drilled alignment holes do not disclose the limitations of the claims relating to the size of fluid feed slots.

3. Claims 21-27:

Neither Murthy nor Mantell disclose, teach or suggest at least the following limitations of Claim 21:

> " . . . the fluid feed slot has a diamond shape . . . ." or

> "said fluid slot . . . having an opening at the first surface having a width W1 that is less than a width W2 of an opening at the second surface, said fluid slot tapering from said opening at said second surface to an internal width that is larger than the width W2 at an intermediate

> location between said first and second surface, the fluid slot tapering from said internal width to the width W1 at said opening in said first surface."

Mantell discloses a pentagonal-shaped ejector channel. There is no disclosure, teaching or suggestion that an ink feed slot of Murthy could have the shape of an ejector channel of Mantell.

D. SUMMARY OF THE INVENTION

The examiner objected to the Specification on the ground that a SUMMARY OF THE INVENTION was missing. The applicant respectfully traverses the examiner's objection to the specification on the ground that a SUMMARY OF THE INVENTION is not required. The rules state:

> "A brief summary of the invention . . . should precede the detailed description. Such summary should, when set forth, . . . be that of the invention as claimed."

37 CFR § 1.73 (emphasis added). The permissive should, which appears twice in the rule and the conditional "when set forth" clearly indicate that a summary is not required, but is only optional. Applicant respectfully requests that the examiner withdraw the objection.

II. CONCLUSION:

The applicants respectfully suggest that the examiner should withdraw the § 103 rejection for obviousness over Murthy in view of Mantell. Neither Mantell nor Murthy, alone or in combination, disclose, teach or suggest all of the limitations of any of claims 15-27.

Moreover, the examiner has not established a motivation to combine the fluid ejectors of Mantell with the ink feed slots of Murthy. The applicants respectfully request that the examiner place Claims 15-27 in condition for allowance.

Respectfully submitted,

Dated: 2/28/03

Peter J. Reitan
Registration No. 48,603

P.O. Box 8569
Newport Beach, CA 92658-8569
Telephone (949) 640-6200
Facsimile (949) 640-1206